

The s. s. "Milanese," in the English Channel, on the 30th, had strong wsw. gales and high seas, continuing with heavy squalls on the 31st.

#### OCEAN ICE.

The only icebergs reported during the month were on the southeast coast of Newfoundland, and their position is indicated on chart i by shaded spots. These are undoubtedly the same as those reported in December off the entrance to Saint John's Harbor.

#### SIGNAL SERVICE AGENCIES.

Signal Service agencies have been established in the Maritime Exchange buildings at New York City and Philadelphia, and in the Custom-House, Boston, where the necessary blanks and other information will be furnished to ship-masters.

In pursuance of the arrangements made with the Meteorological Office of London, England, there were cabled to that office from New York during January, 1886, eleven reports concerning storms encountered by vessels in the Atlantic west of the forty-fifth meridian; two message was sent from Boston.

#### TEMPERATURE OF THE AIR.

[Expressed in degrees, Fahrenheit.]

The distribution of mean temperature over the United States and Canada for January, 1886, is exhibited on chart ii by the dotted isothermal lines; and in the tables of miscellaneous data are given the monthly mean temperatures, with the departures from the normal, for the various stations of the Signal Service.

In the following table are given the mean temperatures for the several geographical districts, with the normals and departures, as deduced from Signal Service observations:

Average temperatures for January.

| Districts.                       | Average for Jan.<br>Signal-Service ob-<br>servations. |           | Comparison<br>of Jan.,<br>1886, with<br>the average<br>for several<br>years. |
|----------------------------------|-------------------------------------------------------|-----------|------------------------------------------------------------------------------|
|                                  | For sev-<br>eral years.                               | For 1886. |                                                                              |
| New England .....                | 25.5                                                  | 24.8      | - 0.7                                                                        |
| Middle Atlantic States.....      | 33.3                                                  | 30.0      | - 3.3                                                                        |
| South Atlantic States.....       | 40.7                                                  | 40.8      | - 5.9                                                                        |
| Florida Peninsula.....           | 60.8                                                  | 54.2      | - 6.6                                                                        |
| Eastern Gulf States.....         | 48.4                                                  | 40.7      | - 7.7                                                                        |
| Western Gulf States.....         | 46.0                                                  | 39.4      | - 7.2                                                                        |
| Rio Grande Valley.....           | 57.2                                                  | 52.8      | - 4.4                                                                        |
| Tennessee.....                   | 39.5                                                  | 31.1      | - 8.4                                                                        |
| Ohio Valley.....                 | 31.7                                                  | 25.9      | - 5.8                                                                        |
| Lower Lake region.....           | 25.6                                                  | 22.0      | - 3.6                                                                        |
| Upper Lake region.....           | 18.1                                                  | 15.5      | - 2.6                                                                        |
| Extreme Northwest.....           | 2.4                                                   | 4.1       | - 6.5                                                                        |
| Upper Mississippi Valley.....    | 22.8                                                  | 15.7      | - 7.1                                                                        |
| Missouri Valley.....             | 17.3                                                  | 6.8       | - 10.5                                                                       |
| Northern slope.....              | 17.7                                                  | 10.4      | - 7.3                                                                        |
| Middle slope.....                | 24.9                                                  | 19.3      | - 5.6                                                                        |
| Southern slope.....              | 39.4                                                  | 35.0      | - 4.4                                                                        |
| Southern plateau.....            | 40.4                                                  | 41.0      | + 0.6                                                                        |
| Middle plateau.....              | 29.0                                                  | 30.7      | + 1.7                                                                        |
| Northern plateau.....            | 25.8                                                  | 25.3      | - 0.5                                                                        |
| North Pacific coast region.....  | 39.3                                                  | 38.0      | - 1.3                                                                        |
| Middle Pacific coast region..... | 47.5                                                  | 47.7      | + 0.2                                                                        |
| South Pacific coast region.....  | 53.1                                                  | 54.9      | + 1.8                                                                        |

In the Canadian Maritime Provinces, northern New England, California, and over the western portions of the middle and southern plateau districts, the monthly mean temperatures were above the normal, the departures being greatest in the Canadian Maritime Provinces, where they were from 4° to 6°; over the plateau districts and California the departures were below 3°. In all other districts the mean temperatures were below the normal, the departures ranging from 4° to 10° over the greater part of the country to the eastward of the Rocky Mountains. The district showing the greatest departure below the normal temperature is the Missouri Valley, where the average (four stations) is 10°.5; over the northern slope, Tennessee, and the Gulf States the average departures ranged from 7°.2, in the west Gulf states, to 8°.4, in Tennessee. In the Atlantic coast districts the average departures below the normal temperature increased from less than 1° in New England to 3°.

in the middle Atlantic states, 5°.9 in the south Atlantic states, and to 6°.6 in Florida. Over the middle and southern Rocky Mountain slopes and Rio Grande Valley the temperature averaged about 5° below the normal.

The following are some of the most marked departures reported from Signal Service stations:

| Above normal.                             |     | Below normal.                  |      |
|-------------------------------------------|-----|--------------------------------|------|
| Mount Washington, New Hampshire .....     | 6.4 | Omaha, Nebraska .....          | 13.1 |
| Sydney, Nova Scotia.....                  | 6.4 | Little Rock, Arkansas.....     | 12.5 |
| Charlottetown, Prince Edward Island ..... | 5.7 | Leavenworth, Kansas.....       | 11.2 |
| Halifax, Nova Scotia.....                 | 5.6 | Memphis, Tennessee.....        | 10.8 |
| Frederickton, New Brunswick.....          | 4.5 | Fort Assinaboine, Montana..... | 10.4 |
| Eastport, Maine.....                      | 3.3 | Poplar River, Montana.....     | 10.1 |
| Winnemucca, Nevada.....                   | 2.9 | Calro, Illinois.....           | 9.7  |
| Prescott, Arizona.....                    | 2.8 | Vicksburg, Mississippi.....    | 9.6  |
| Los Angeles, California.....              | 2.1 | Nashville, Tennessee.....      | 9.5  |

#### RANGES OF TEMPERATURE.

The monthly, and the greatest and least monthly ranges of temperature, are given in the tables of miscellaneous meteorological data.

The following are some of the greatest and least monthly ranges:

| Greatest.                      |       | Least.                                    |      |
|--------------------------------|-------|-------------------------------------------|------|
| Fort Benton, Montana.....      | 100.1 | San Francisco, California.....            | 26.5 |
| Fort Assinaboine, Montana..... | 95.4  | Cape Mendocino, California.....           | 27.4 |
| Fort Buford, Dakota.....       | 92.3  | Fort Canby, Washington Territory.....     | 30.5 |
| Helena, Montana.....           | 91.9  | Tatoosh Island, Washington Territory..... | 32.0 |
| Poplar River, Montana.....     | 90.1  | Pysh, Washington Territory.....           | 32.0 |
| Valentine, Nebraska.....       | 87.1  | Red Bluff, California.....                | 34.5 |
| Fort Maginnis, Montana.....    | 82.9  | Sacramento, California.....               | 34.7 |
| Denver, Colorado.....          | 81.7  | Astoria, Oregon.....                      | 35.0 |

#### DEVIATIONS FROM NORMAL TEMPERATURES.

In the table below are given, for certain stations, as reported by voluntary observers, the normal temperatures for January for a series of years, the mean temperature for January, 1886, and the departures from the normal:

| Station.              | County.          | Normal tem-<br>perature for<br>January. | Number<br>of<br>years. | Mean tem-<br>perature for<br>Jan., 1886. | Departure. |
|-----------------------|------------------|-----------------------------------------|------------------------|------------------------------------------|------------|
| <i>Arkansas.</i>      |                  |                                         |                        |                                          |            |
| Lead Hill.....        | Boone.....       | 29.6                                    | 4                      | 24.2                                     | - 5.4      |
| <i>California.</i>    |                  |                                         |                        |                                          |            |
| Princeton.....        | Colusa.....      | 45.8                                    | 14                     | 47.7                                     | + 1.9      |
| Sacramento.....       | Sacramento.....  | 45.4                                    | 20                     | 46.6                                     | + 1.2      |
| <i>Connecticut.</i>   |                  |                                         |                        |                                          |            |
| Hartford.....         | Hartford.....    | 23.4                                    | 2                      | 23.4                                     | 0.0        |
| Middletown.....       | Middlesex.....   | 24.9                                    | 28                     | 22.9                                     | - 2.0      |
| New Haven.....        | New Haven.....   | 26.7                                    | 100                    | 25.3                                     | - 1.4      |
| New London.....       | New London.....  | 28.2                                    | 16                     | 27.8                                     | - 0.4      |
| <i>Dakota.</i>        |                  |                                         |                        |                                          |            |
| Webster.....          | Day.....         | 1.8                                     | 3                      | 0.0                                      | - 1.8      |
| <i>Illinois.</i>      |                  |                                         |                        |                                          |            |
| Anna.....             | Union.....       | 32.5                                    | 11                     | 24.3                                     | - 8.2      |
| Mattoon.....          | Coles.....       | 25.3                                    | 6                      | 21.5                                     | - 3.8      |
| Riley.....            | McHenry.....     | 17.2                                    | 23                     | 14.4                                     | - 2.8      |
| Swanwick.....         | Perry.....       | 25.1                                    | 4                      | 22.1                                     | - 3.0      |
| <i>Indiana.</i>       |                  |                                         |                        |                                          |            |
| Lafayette.....        | Tippecanoe.....  | 23.2                                    | 7                      | 19.1                                     | - 4.1      |
| Logansport.....       | Cass.....        | 26.2                                    | 31                     | 22.7                                     | - 3.5      |
| Mauzy.....            | Rush.....        | 21.0                                    | 6                      | 19.2                                     | - 1.8      |
| Spice land.....       | Henry.....       | 26.0                                    | 32                     | 21.9                                     | - 4.1      |
| Vevay.....            | Switzerland..... | 31.4                                    | 21                     | 27.5                                     | - 4.1      |
| <i>Iowa.</i>          |                  |                                         |                        |                                          |            |
| Creco.....            | Howard.....      | 10.1                                    | 10                     | 4.5                                      | - 5.6      |
| Monticello.....       | Jones.....       | 15.4                                    | 32                     | 9.8                                      | - 5.6      |
| Muscatine.....        | Muscatine.....   | 19.3                                    | 46                     | 14.2                                     | - 5.1      |
| <i>Kansas.</i>        |                  |                                         |                        |                                          |            |
| Fort Scott.....       | Bourbon.....     | 25.8                                    | 7                      | 21.2                                     | - 4.6      |
| Independence.....     | Montgomery.....  | 27.7                                    | 14                     | 18.6                                     | - 9.1      |
| Wellington.....       | Sumner.....      | 25.0                                    | 8                      | 17.6                                     | - 7.4      |
| Yates Centre.....     | Woodson.....     | 23.2                                    | 6                      | 15.8                                     | - 7.4      |
| <i>Maine.</i>         |                  |                                         |                        |                                          |            |
| Belfast.....          | Waldo.....       | 18.9                                    | 27                     | 20.8                                     | + 1.9      |
| Bridgeton.....        | Somerset.....    | 17.3                                    | 11                     | 18.9                                     | + 1.6      |
| Eastport.....         | Washington.....  | 19.8                                    | 13                     | 22.9                                     | + 3.1      |
| Gardiner.....         | Kennebec.....    | 17.8                                    | 50                     | 19.4                                     | + 1.6      |
| Orono.....            | Penobscot.....   | 15.4                                    | 18                     | 18.0                                     | + 2.6      |
| <i>Maryland.</i>      |                  |                                         |                        |                                          |            |
| Fallston.....         | Harford.....     | 29.9                                    | 15                     | 26.6                                     | - 3.3      |
| <i>Massachusetts.</i> |                  |                                         |                        |                                          |            |
| Amherst.....          | Hampshire.....   | 23.3                                    | 49                     | 23.7                                     | + 0.4      |
| Cambridge.....        | Middlesex.....   | 24.9                                    | 64                     | 24.2                                     | - 0.7      |
| Fitchburg.....        | Worcester.....   | 22.3                                    | 29                     | 21.7                                     | - 0.6      |
| Lowell.....           | Middlesex.....   | 23.8                                    | 10                     | 23.9                                     | + 0.1      |
| New Bedford.....      | Bristol.....     | 28.3                                    | 74                     | 27.2                                     | - 1.1      |
| Somerset.....         | Bristol.....     | 26.2                                    | 16                     | 26.5                                     | + 0.4      |

Deviations from normal temperatures—Continued.

| Station.                        | County.     | Normal temperature for January. | Number of years. | Mean temperature for Jan., 1886. | Departure. |
|---------------------------------|-------------|---------------------------------|------------------|----------------------------------|------------|
| <i>Massachusetts—Continued.</i> |             |                                 |                  |                                  |            |
| Springfield                     | Hampden     | 25.9                            | 19               | 23.6                             | -2.3       |
| Williamstown                    | Berkshire   | 21.5                            | 33               | 19.7                             | -1.8       |
| Worcester                       | Worcester   | 25.1                            | 48               | 21.9                             | -3.2       |
| <i>New Brunswick.</i>           |             |                                 |                  |                                  |            |
| Saint John                      | Saint John  | 18.1                            | 26               | 21.0                             | +2.9       |
| <i>New Hampshire.</i>           |             |                                 |                  |                                  |            |
| Concord                         | Merrimack   | 21.4                            | 19               | 23.4                             | +2.0       |
| Hanover                         | Grafton     | 16.3                            | 22               | 16.2                             | -0.1       |
| <i>New York.</i>                |             |                                 |                  |                                  |            |
| Plattsburg Barracks             | Citnton     | 16.8                            | 17               | 16.4                             | -0.4       |
| Factoryville                    | Tioga       | 20.4                            | 4                | 20.1                             | -0.3       |
| Palermo                         | Oswego      | 21.0                            | 33               | 17.5                             | -3.5       |
| North Volney                    | Oswego      | 21.7                            | 18               | 18.0                             | -3.7       |
| <i>Ohio.</i>                    |             |                                 |                  |                                  |            |
| Wauseon                         | Fulton      | 22.9                            | 16               | 19.0                             | -3.9       |
| <i>Pennsylvania.</i>            |             |                                 |                  |                                  |            |
| Dyberry                         | Wayne       | 21.0                            | 22               | 19.9                             | -1.1       |
| <i>Rhode Island.</i>            |             |                                 |                  |                                  |            |
| Providence                      | Providence  | 26.9                            | 52               | 26.2                             | -0.7       |
| <i>Texas.</i>                   |             |                                 |                  |                                  |            |
| New Ulm                         | Austin      | 50.3                            | 13               | 43.6                             | -6.7       |
| <i>Vermont.</i>                 |             |                                 |                  |                                  |            |
| Lunenburg                       | Essex       | 15.5                            | 38               | 15.0                             | -0.5       |
| Newport                         | Orleans     | 14.7                            | 11               | 14.8                             | +0.1       |
| Brafford                        | Orange      | 16.0                            | 11               | 15.9                             | -0.1       |
| <i>Virginia.</i>                |             |                                 |                  |                                  |            |
| Bird's Nest                     | Northampton | 39.7                            | 18               | 35.4                             | -4.3       |
| Dale Enterprise                 | Rockingham  | 28.8                            | 6                | 28.2                             | -0.6       |
| Variety Mills                   | Nelson      | 34.7                            | 9                | 28.7                             | -6.0       |
| Wytheville                      | Wythe       | 24.7                            | 21               | 29.1                             | +5.6       |
| <i>West Virginia.</i>           |             |                                 |                  |                                  |            |
| Helvetia                        | Randolph    | 32.6                            | 10               | 29.0                             | -3.6       |

\* From the "Bulletin of the New England Meteorological Society."

The following notes on temperature are given by voluntary observers:

*Arkansas.*—Lead Hill, Boone county: the severe cold from the 8th to the 18th caused great suffering and some loss to stock.

*Georgia.*—Forsyth, Monroe county: the thermometer read lower on December 30, 1880, and as low on January 6, 1884, but the mean temperature of the 11th was 5° lower than it has been in the past twelve years.

*Indiana.*—Logansport, Cass county: the maximum temperature that has occurred in January during the past thirty-one years was 72°, in 1876, and the minimum, -30°, in 1873; the highest mean temperature was 43°, in 1880, and the lowest, 10°.5, in 1875.

*Mauzy, Rush county:* the highest mean temperature that has occurred in January in the past six years was 28°.2, in 1882, and the lowest, 16°.0, in 1884.

*Iowa.*—Monticello, Jones county: the maximum temperature that has occurred in any January during the past thirty-two years was 62°, in 1855, and the minimum, -33°, in 1884.

*Maryland.*—Fallston, Harford county: the highest January mean temperature, 40°.1, occurred in 1880, and the lowest, 25°.0, in 1881.

*Massachusetts.*—Worcester, Worcester county: from the records of the preceding forty-seven years the extremes of temperature in January are -18°, in 1880, and 64°.5, in 1876; the coldest day was in 1882, with a mean of -8°.6; the warmest days were in 1841 and 1848, with a mean each day of 63°; the coldest January was in 1857, the mean being 15°.9, and the warmest was in 1882, when the mean for the month was 33°.6.

*Missouri.*—Springfield, Greene county: the mean temperature for January, 21°.5, is the lowest ever recorded at this place.

*New York.*—North Volney, Oswego county: the coldest January occurred in 1881, the mean being 15°.1; the highest mean was 31°.8, in 1880.

*Ohio.*—Wauseon, Fulton county: the highest January mean for a period of sixteen years was 37°.7, in 1880, and the lowest, 12°.2, in 1875; the extremes during this period were 69°.5, in 1876, and 31°.7, in 1884.

*Texas.*—New Ulm, Austin county: the highest January mean temperature for the past thirteen years was 63°.7, in 1880, and the lowest, 43°.2, in 1881; the extremes for January during this period were 84°.0, in 1880, and 7°.0, in 1886.

*Virginia.*—Wytheville, Wythe county: the minimum temperature for January, 2°.0, was lower than any previous January for the past twenty-one years.

Variety Mills, Nelson county: the month was remarkable for its low temperature; the minimum, -12°.5, has been exceeded but once during the last eleven years, viz., December 31, 1880, when the thermometer fell to -16°.0.

## FROSTS.

Frosts occurred in the various states and territories during the month, as follows:

*New England.*—1st to 4th, 6th to 31st.

*Middle Atlantic states.*—1st to 31st.

*South Atlantic states.*—1st, 4th to 31st.

*Florida Peninsula.*—6th to 14th.

*East Gulf states.*—1st, 4th to 25th, 29th, 30th, 31st.

Table of comparative maximum and minimum temperatures for January.

| State or Territory.  | Station.         | For 1886. |      | Since establishment of station. |                        |      |
|----------------------|------------------|-----------|------|---------------------------------|------------------------|------|
|                      |                  | Max.      | Min. | Max.                            | Year.                  | Min. |
| Alabama              | Mobile           | 68.3      | 11.0 | 78.0                            | 1882                   | 13.9 |
| Do                   | Montgomery       | 66.1      | 5.4  | 78.5                            | 1882                   | 8.0  |
| Arizona              | Prescott         | 60.0      | 8.0  | 71.0                            | 1882                   | 17.0 |
| Do                   | Fort Apache      | 63.7      | 9.5  | 67.0                            | 1881, 1882             | 5.0  |
| Arkansas             | Fort Smith       | 64.0      | 0.9  | 69.3                            | 1885                   | 5.0  |
| Do                   | Little Rock      | 61.0      | 4.8  | 78.0                            | 1880                   | 5.5  |
| California           | San Francisco    | 67.5      | 41.0 | 69.0                            | 1877                   | 36.0 |
| Do                   | Los Angeles      | 75.3      | 32.0 | 82.0                            | 1881                   | 30.0 |
| Colorado             | Denver           | 62.8      | 18.9 | 67.0                            | 1882                   | 22.0 |
| Do                   | Pike's Peak      | 18.9      | 29.8 | 30.0                            | 1879                   | 37.0 |
| Connecticut          | New Haven        | 52.4      | 6.9  | 63.0                            | 1876                   | 14.0 |
| Do                   | New London       | 49.9      | 3.3  | 65.0                            | 1880                   | 2.0  |
| Dakota               | Fort Buford      | 44.1      | 48.2 | 47.0                            | 1880                   | 46.0 |
| Do                   | Yankton          | 42.1      | 27.5 | 67.0                            | 1880                   | 32.0 |
| Delaware             | Cape Henlopen    | 59.7      | 6.4  |                                 |                        |      |
| Do                   | Del. Breakwater  |           |      | 60.0                            | 1880                   | 9.0  |
| District of Columbia | Washington City  | 59.9      | 1.2  | 71.0                            | 1874, 1876             | 14.0 |
| Florida              | Jacksonville     | 72.9      | 15.3 | 80.0                            | 1875, 1876, 1877, 1879 | 21.6 |
| Do                   | Key West         | 79.2      | 40.8 | 90.0                            | 1877                   | 48.0 |
| Georgia              | Atlanta          | 59.9      | 2.4  | 73.0                            | 1879, 1882             | 1.3  |
| Do                   | Savannah         | 70.0      | 12.0 | 80.0                            | 1879                   | 18.0 |
| Idaho                | Boise City       | 53.3      | 1.3  | 59.2                            | 1885                   | 7.3  |
| Do                   | Lewiston         |           |      | 59.0                            | 1880                   | 14.2 |
| Illinois             | Calto            | 57.2      | 9.0  | 70.0                            | 1876, 1880             | 16.0 |
| Do                   | Chicago          | 48.3      | 14.4 | 65.0                            | 1876                   | 18.5 |
| Indiana              | Indianapolis     | 55.3      | 15.0 | 69.0                            | 1876                   | 25.0 |
| Indian Territory     | Fort Sill        | 68.0      | 5.0  | 75.0                            | 1880                   | 9.0  |
| Iowa                 | Dubuque          | 37.8      | 23.1 | 62.0                            | 1874                   | 26.2 |
| Do                   | Keokuk           | 52.3      | 18.7 | 64.0                            | 1874                   | 24.0 |
| Kansas               | Dodge City       | 44.0      | 16.2 | 70.0                            | 1876                   | 20.0 |
| Do                   | Leavenworth      | 45.5      | 20.5 | 65.0                            | 1876                   | 29.0 |
| Kentucky             | Louisville       | 61.9      | 7.5  | 71.0                            | 1876                   | 19.5 |
| Louisiana            | New Orleans      | 71.9      | 15.3 | 78.0                            | 1879                   | 20.0 |
| Do                   | Shreveport       | 69.9      | 1.3  | 78.0                            | 1876, 1880             | 6.0  |
| Maine                | Eastport         | 46.1      | 14.9 | 51.0                            | 1874                   | 20.0 |
| Do                   | Portland         | 47.8      | 12.4 | 58.0                            | 1876                   | 11.5 |
| Maryland             | Baltimore        | 56.7      | 2.5  | 71.0                            | 1876                   | 6.0  |
| Massachusetts        | Boston           | 53.6      | 10.1 | 69.5                            | 1876                   | 13.0 |
| Michigan             | Detroit          | 55.1      | 3.5  | 65.0                            | 1876                   | 20.0 |
| Do                   | Marquette        | 35.4      | 17.8 | 56.0                            | 1880                   | 26.0 |
| Minnesota            | Duluth           | 31.2      | 31.7 | 51.0                            | 1877                   | 41.2 |
| Do                   | Saint Paul       | 30.0      | 33.9 | 49.0                            | 1879                   | 35.6 |
| Mississippi          | Vicksburg        | 72.3      | 3.1  | 80.0                            | 1879                   | 10.0 |
| Missouri             | Saint Louis      | 60.0      | 8.2  | 72.0                            | 1880                   | 21.5 |
| Montana              | Fort Benton      | 49.1      | 51.0 | 58.0                            | 1880                   | 55.0 |
| Do                   | Helena           | 49.3      | 30.2 | 57.0                            | 1885                   | 34.0 |
| Nebraska             | North Platte     | 52.0      | 21.2 | 70.0                            | 1880                   | 27.0 |
| Do                   | Omaha            | 41.8      | 24.1 | 62.0                            | 1879, 1880             | 32.0 |
| Nevada               | Winnemucca       | 57.0      | 2.4  | 57.0                            | 1878                   | 14.0 |
| New Hampshire        | Mount Washington | 37.5      | 36.6 | 42.0                            | 1874                   | 50.0 |
| New Jersey           | Atlantic City    | 52.8      | 2.1  | 64.0                            | 1880                   | 3.0  |
| Do                   | Sandy Hook       | 52.1      | 4.1  | 63.4                            | 1885                   | 3.0  |
| New Mexico           | Santa Fe         | 48.0      | 6.5  | 76.0                            | 1879                   | 13.0 |
| New York             | Buffalo          | 57.6      | 1.4  | 65.5                            | 1874                   | 13.5 |
| Do                   | New York City    | 53.9      | 3.0  | 64.0                            | 1876, 1880             | 6.0  |
| North Carolina       | Charlotte        | 63.0      | 0.6  | 71.0                            | 1885                   | 5.0  |
| Do                   | Wilmington       |           |      | 77.0                            | 1879                   | 9.0  |
| Ohio                 | Cincinnati       | 56.6      | 12.4 | 69.0                            | 1876                   | 10.0 |
| Do                   | Toledo           | 53.2      | 11.4 | 66.0                            | 1873, 1876             | 14.0 |
| Oregon               | Portland         | 60.0      | 15.0 | 59.2                            | 1884                   | 3.0  |
| Do                   | Roseburg         | 62.2      | 22.7 | 66.0                            | 1885                   | 12.0 |
| Pennsylvania         | Pittsburgh       | 58.1      | 3.9  | 67.0                            | 1876                   | 5.0  |
| Do                   | Black Island     | 60.6      | 4.8  | 75.0                            | 1874                   | 12.0 |
| Rhode Island         | Charleston       | 52.1      | 0.9  | 58.8                            | 1881                   | 4.0  |
| South Carolina       | Knoxville        | 70.3      | 10.5 | 80.0                            | 1879                   | 13.0 |
| Tennessee            | Nashville        | 60.8      | 6.0  | 74.0                            | 1876                   | 16.0 |
| Do                   | Fort Davis       | 58.9      | 9.0  | 74.0                            | 1870                   | 10.2 |
| Texas                | Galveston        | 73.3      | 3.2  | 77.0                            | 1880                   | 0.0  |
| Do                   | Salt Lake City   | 68.7      | 11.0 | 75.0                            | 76, 80, 82             | 20.0 |
| Utah                 | Lynchburg        | 52.8      | 2.0  | 54.0                            | 1879                   | 20.0 |
| Virginia             | Norfolk          | 65.0      | 2.7  | 72.0                            | 1876, 1879             | 4.0  |
| Do                   | Dayton           | 63.2      | 9.4  | 80.0                            | 1871                   | 8.0  |
| Washington Ter.      | Olympia          | 51.5      | 15.1 | 59.0                            | 1885                   | 9.0  |
| Do                   | La Crosse        | 36.7      | 25.6 | 59.0                            | 1874                   | 43.0 |
| Wisconsin            | Milwaukee        | 45.1      | 21.8 | 59.0                            | 1871, 1874             | 25.0 |
| Wyoming              | Cheyenne         | 51.4      | 27.0 | 63.0                            | 1880                   | 38.0 |

*West Gulf states.*—2d to 13th, 16th, 19th to 25th, 27th to 31st.

*Rio Grande Valley.*—Brownsville, Texas, 8th; Rio Grande City, Texas, 8th, 9th; Fort McIntosh, Texas, 12th.

*Tennessee.*—1st, 3d to 31st.

*Ohio Valley.*—1st to 26th, 28th to 31st.

*Lower lake region.*—1st to 31st.

*Upper lake region.*—1st to 31st.

*Extreme northwest.*—1st to 31st.

*Upper Mississippi Valley.*—1st to 31st.

*Missouri Valley.*—1st to 31st.

*Northern slope.*—1st to 31st.

*Middle slope.*—1st to 31st.

*Southern slope.*—3d, 5th, 6th, 11th, 12th, 14th to 19th, 21st to 24th, 27th, 28th, 29th, 31st.

*Southern plateau.*—2d to 10th, 15th, 19th, 22d, 23d, 26th to 31st.

*Middle plateau.*—1st to 31st.

*Northern plateau.*—1st to 4th, 7th to 12th, 16th.

*North Pacific coast region.*—1st to 12th; 14th to 24th.

*Middle Pacific coast region.*—1st to 16th, 18th.

*South Pacific coast region.*—2d to 8th.

#### ICE.

Ice formed in the southern part of the country, as follows:

*Alabama.*—Birmingham, 8th to 14th; Greensborough, 9th to 13th.

*Arizona.*—Tucson, 9th; Yuma, 2d, 3d, 4th.

*California.*—Los Angeles, 2d to 6th.

*Florida.*—Archer, 6th to 14th; Merritt's Island and Limona, 10th, 11th, 12th; Manatee, 12th; Sanford, 10th; Jacksonville, 9th, 10th; Cedar Keys, 11th, 12th, 13th.

*Georgia.*—Forsyth, 13th; Quitman, 9th to 13th; Atlanta, 15th; Savannah, 10th; Athens, 6th, 7th, 13th, 14th, 18th, 19th, 20th, 30th, 31st; Milledgeville, 12th.

*Louisiana.*—New Orleans, 9th to 12th; Point Pleasant, 4th, 5th, 6th, 9th.

*North Carolina.*—Charlotte, 13th; Smithville, 6th, 9th; Fort Macon, 9th to 14th.

*South Carolina.*—Stateburg, 9th to 15th; Charleston, 9th.

*Texas.*—Corsicana, 11th, 12th, 21st to 24th, 26th, 27th, 30th, 31st; Palestine, 8th, 9th; San Antonio, 8th to 11th; Indianola, 8th; Galveston, 7th to 11th; Brownsville, 8th, 9th; Rio Grande City, 10th; Fort Concho, 5th to 11th.

#### PRECIPITATION.

[Expressed in inches and hundredths.]

The distribution of rainfall over the United States and Canada for January, 1886, as determined from reports from more than seven hundred stations, is exhibited on chart iii.

In the following table are shown, for the several geographical districts, the normal January precipitation for a series of years; the average for January, 1886, and the excess or deficiency as compared with the normal:

#### Average precipitation for January.

| Districts.                       | Average for January, Signal-Service observations. |           | Comparison of Jan., 1886, with the average for several years. |
|----------------------------------|---------------------------------------------------|-----------|---------------------------------------------------------------|
|                                  | For several years.                                | For 1886. |                                                               |
|                                  | Inches.                                           | Inches.   | Inches.                                                       |
| New England.....                 | 4.10                                              | 6.00      | +1.90                                                         |
| Middle Atlantic States.....      | 3.99                                              | 3.81      | -0.18                                                         |
| South Atlantic States.....       | 5.26                                              | 4.77      | -0.49                                                         |
| Florida Peninsula.....           | 3.28                                              | 2.72      | -0.56                                                         |
| Eastern Gulf States.....         | 6.10                                              | 6.80      | +0.70                                                         |
| Western Gulf States.....         | 3.87                                              | 4.61      | +0.74                                                         |
| Rio Grande Valley.....           | 1.70                                              | 1.44      | -0.26                                                         |
| Tennessee.....                   | 6.32                                              | 5.66      | -0.66                                                         |
| Ohio Valley.....                 | 3.52                                              | 3.81      | +0.29                                                         |
| Lower lake region.....           | 2.69                                              | 3.15      | +0.46                                                         |
| Upper lake region.....           | 2.14                                              | 3.44      | +1.30                                                         |
| Extreme northwest.....           | 0.54                                              | 0.97      | +0.43                                                         |
| Upper Mississippi Valley.....    | 1.82                                              | 2.81      | +0.99                                                         |
| Missouri Valley.....             | 0.63                                              | 0.92      | +0.29                                                         |
| Northern slope.....              | 0.99                                              | 0.94      | -0.05                                                         |
| Middle slope.....                | 0.34                                              | 0.90      | +0.56                                                         |
| Southern slope.....              | 0.90                                              | 0.32      | -0.58                                                         |
| Southern plateau.....            | 0.69                                              | 2.27      | +1.58                                                         |
| Middle plateau.....              | 1.24                                              | 1.31      | +0.07                                                         |
| Northern plateau.....            | 2.63                                              | 1.42      | -1.21                                                         |
| North Pacific coast region.....  | 7.13                                              | 8.80      | +1.67                                                         |
| Middle Pacific coast region..... | 4.04                                              | 6.21      | +2.17                                                         |
| South Pacific coast region.....  | 1.22                                              | 4.42      | +3.20                                                         |

The precipitation for January, 1886, is in excess of the average on the Pacific coast, in the plateau districts, and generally in all northern districts east of the Rocky Mountains; over portions of Alabama, Mississippi, and Louisiana the precipitation is also above the average. The greatest excess occurs in California, where it averages from two to three inches. In New England, the upper lake region, northern plateau, and in the north Pacific coast, the excess averages more than one inch; in other districts where an excess is shown the values

are less marked. In Montana, the northern slope, Rio Grande Valley, Tennessee, and on the Atlantic coast from central New Jersey southward the precipitation is below the average for January, the deficiencies generally averaging below one-half inch.

#### DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows, for certain stations, as reported by voluntary observers, the average precipitation for the month of January for a series of years; the precipitation for January, 1886; and the departures from the average:

| Station.                 | County.          | Average precipitation for Jan. | Number of years. | Precipitation for January, 1886. | Departure. |
|--------------------------|------------------|--------------------------------|------------------|----------------------------------|------------|
|                          |                  | Inches.                        |                  | Inches.                          | Inches.    |
| <i>Arkansas.</i>         |                  |                                |                  |                                  |            |
| Lead Hill.....           | Boone.....       | 2.64                           | 4                | 2.45                             | -0.19      |
| <i>California.</i>       |                  |                                |                  |                                  |            |
| Sacramento.....          | Sacramento.....  | 4.22                           | 12               | 6.26                             | +2.04      |
| <i>Connecticut.</i>      |                  |                                |                  |                                  |            |
| Hartford.....            | Hartford.....    | 3.81                           | 14               | 4.60                             | +0.79      |
| Middletown.....          | Middlesex.....   | 4.06                           | 28               | 5.22                             | +1.16      |
| New Haven.....           | New Haven.....   | 4.18                           | 14               | 3.53                             | -0.65      |
| New London.....          | New London.....  | 4.40                           | 16               | 7.36                             | +2.96      |
| Wallingford.....         | New Haven.....   | 4.34                           | 28               | 5.37                             | +1.03      |
| <i>Dakota.</i>           |                  |                                |                  |                                  |            |
| Webster.....             | Day.....         | 1.69                           | 3                | 1.24                             | -0.45      |
| <i>Illinois.</i>         |                  |                                |                  |                                  |            |
| Anna.....                | Union.....       | 3.68                           | 11               | 3.18                             | -0.50      |
| Mattoon.....             | Coles.....       | 2.63                           | 6                | 2.80                             | +0.17      |
| Riley.....               | McHenry.....     | 1.82                           | 24               | 3.60                             | +1.78      |
| Swanwick.....            | Perry.....       | 1.84                           | 4                | 2.63                             | +0.79      |
| <i>Indiana.</i>          |                  |                                |                  |                                  |            |
| Lafayette.....           | Tippecanoe.....  | 2.39                           | 7                | 1.75                             | -0.64      |
| Logansport.....          | Cass.....        | 2.04                           | 31               | 2.26                             | +0.22      |
| Mauzy.....               | Rush.....        | 3.18                           | 6                | 4.27                             | +1.09      |
| Spiceland.....           | Henry.....       | 2.89                           | 27               | 3.75                             | +0.86      |
| Vevay.....               | Switzerland..... | 4.05                           | 21               | 3.57                             | -0.48      |
| <i>Iowa.</i>             |                  |                                |                  |                                  |            |
| Cresco.....              | Howard.....      | 0.96                           | 10               | 3.72                             | +2.76      |
| Monticello.....          | Jones.....       | 1.75                           | 32               | 3.35                             | +1.60      |
| <i>Kansas.</i>           |                  |                                |                  |                                  |            |
| Independence.....        | Montgomery.....  | 1.59                           | 14               | 1.58                             | -0.01      |
| Wellington.....          | Sumner.....      | 0.78                           | 8                | 1.53                             | +0.75      |
| Yates Centre.....        | Woodson.....     | 0.99                           | 6                | 1.64                             | +0.65      |
| <i>Maine.</i>            |                  |                                |                  |                                  |            |
| Eastport.....            | Washington.....  | 3.59                           | 13               | 9.01                             | +5.42      |
| Gardiner.....            | Kennebec.....    | 3.39                           | 48               | 6.61                             | +3.22      |
| Orono.....               | Penobscot.....   | 3.69                           | 18               | 6.64                             | +2.95      |
| <i>Maryland.</i>         |                  |                                |                  |                                  |            |
| Fullerton.....           | Harford.....     | 3.68                           | 15               | 6.00                             | +2.32      |
| <i>Massachusetts.</i>    |                  |                                |                  |                                  |            |
| Amherst.....             | Hampshire.....   | 3.28                           | 51               | 4.55                             | +1.27      |
| Cambridge.....           | Middlesex.....   | 4.07                           | 45               | 7.35                             | +3.28      |
| Chestnut Hill.....       | Middlesex.....   | 4.21                           | 11               | 7.17                             | +2.96      |
| Framingham.....          | Middlesex.....   | 4.07                           | 12               | 6.54                             | +2.47      |
| Lake Cochituate.....     | Middlesex.....   | 3.75                           | 35               | 6.53                             | +2.78      |
| Lowell.....              | Middlesex.....   | 3.00                           | 60               | 5.38                             | +2.38      |
| Lynn.....                | Essex.....       | 3.81                           | 12               | 5.98                             | +2.17      |
| Mystic Lake.....         | Middlesex.....   | 4.04                           | 11               | 6.23                             | +2.19      |
| New Bedford.....         | Bristol.....     | 3.85                           | 73               | 6.77                             | +2.92      |
| Somerset.....            | Bristol.....     | 4.20                           | 16               | 5.09                             | +0.89      |
| Springfield.....         | Hampden.....     | 3.48                           | 39               | 5.31                             | +1.83      |
| Waltham.....             | Middlesex.....   | 3.00                           | 61               | 7.12                             | +4.12      |
| Williamstown.....        | Berkshire.....   | 2.53                           | 21               | 3.92                             | +1.39      |
| Worcester.....           | Worcester.....   | 3.90                           | 46               | 6.52                             | +2.62      |
| <i>New Brunswick.</i>    |                  |                                |                  |                                  |            |
| Saint John.....          | Saint John.....  | 4.11                           | 26               | 8.94                             | +4.83      |
| <i>New Hampshire.</i>    |                  |                                |                  |                                  |            |
| Concord.....             | Merrimack.....   | 3.08                           | 31               | 4.92                             | +1.84      |
| Hanover.....             | Grafton.....     | 2.49                           | 19               | 2.76                             | +0.27      |
| <i>New York.</i>         |                  |                                |                  |                                  |            |
| Plattsburg Barracks..... | Clinton.....     | 1.85                           | 17               | 1.15                             | -0.70      |
| Factoryville.....        | Tioga.....       | 2.34                           | 4                | 3.42                             | +1.08      |
| Palermo.....             | Oswego.....      | 3.14                           | 23               | 3.90                             | +0.76      |
| North Volney.....        | Oswego.....      | 3.26                           | 14               | 4.45                             | +1.19      |
| <i>Ohio.</i>             |                  |                                |                  |                                  |            |
| Wauseon.....             | Fulton.....      | 2.15                           | 12               | 2.78                             | +0.63      |
| <i>Pennsylvania.</i>     |                  |                                |                  |                                  |            |
| Dyberry.....             | Wayne.....       | 2.93                           | 17               | 2.85                             | -0.08      |
| <i>Rhode Island.</i>     |                  |                                |                  |                                  |            |
| Providence.....          | Providence.....  | 3.94                           | 55               | 7.10                             | +3.16      |
| <i>South Carolina.</i>   |                  |                                |                  |                                  |            |
| Kirkwood.....            | Kershaw.....     | 3.40                           | 21               | 2.61                             | -0.79      |
| <i>Texas.</i>            |                  |                                |                  |                                  |            |
| New Ulm.....             | Austin.....      | 4.87                           | 13               | 1.13                             | -3.74      |
| <i>Vermont.</i>          |                  |                                |                  |                                  |            |
| Lunenburg.....           | Essex.....       | 3.01                           | 38               | 2.65                             | -0.36      |
| Newport.....             | Orleans.....     | 3.15                           | 11               | 3.48                             | +0.33      |
| Stratford.....           | Orange.....      | 3.02                           | 11               | 4.40                             | +1.38      |
| <i>Virginia.</i>         |                  |                                |                  |                                  |            |
| Bird's Nest.....         | Northampton..... | 3.68                           | 18               | 3.15                             | -0.53      |
| Dale Enterprise.....     | Rockingham.....  | 3.69                           | 6                | 5.85                             | +2.16      |
| Variety Mills.....       | Nelson.....      | 4.18                           | 7                | 3.82                             | -0.36      |
| Wytheville.....          | Wythe.....       | 3.58                           | 21               | 3.88                             | +0.30      |
| <i>West Virginia.</i>    |                  |                                |                  |                                  |            |
| Helvetia.....            | Randolph.....    | 5.63                           | 10               | 3.45                             | -2.18      |

\* From the "Bulletin of the New England Meteorological Society."

The following notes on the precipitation for January, 1886, are furnished by voluntary observers: